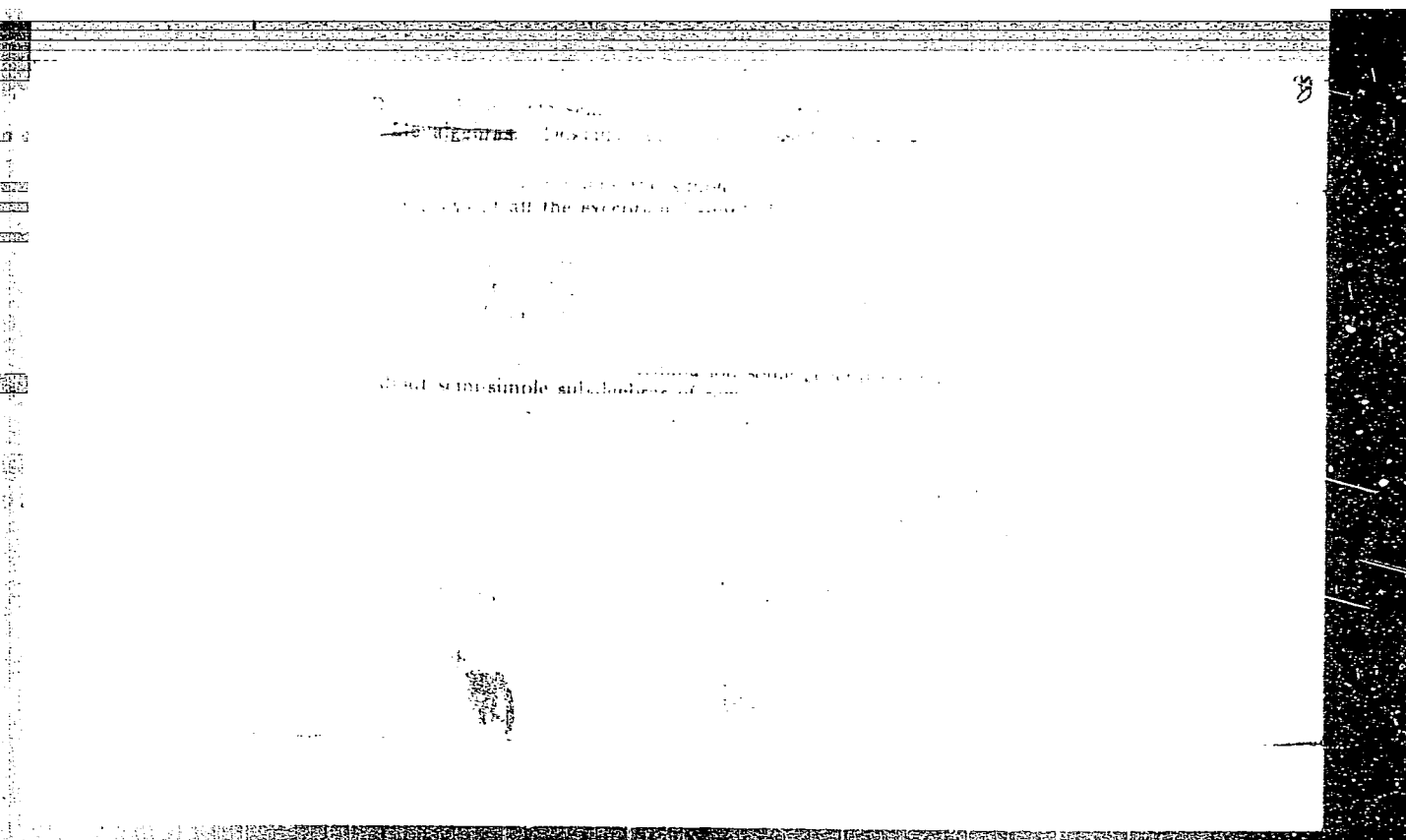


GTRSP, Vol. 5, No.1

Dynkin, J.B., Inclusion relations between non-applicable (not having a common invariant subspace) groups of linear transformations, 5-7.

Akademiya Nauk, S.S.S.R., Doklady, vol. 78, No. 1 (May 1, 1951)





DYMKIN, Ye.B.; USPENSKIY, V.A.

[Mathematical debates: problems for polychrome coloration, problems from the theory of numbers, and random walks] Matematicheskie besedy: zadachi o mnogo-tsvetnoi raskraske, zadachi iz teorii chisel, sluchainye bluzhdaniia. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1952. 288 p. (MLBA 6:8)  
(Mathematics)

DYNKIN, Ye. B.

Maximal subgroups of classical groups. Trudy Mosk. mat. ob., No 1, 1952.

DYNKIN, YE. B.

PA 243T94

USSR/Mathematics - Dissertations Nov/Dec 52

"Doctoral Dissertations: Maximal Subgroups of Classical Groups," Ye. B. Dynkin

"Usp Matemat Nauk" Vol 7, No 6 (52), pp 226-229

An abstract of Dynkin's doctoral dissertation. Thesis was defended at a session of the Sci Council of the Mechanicomathematical Faculty, Moscow State U, held 23 May 51. Official opponents were Acad A. N. Kolmogorov; Prof I. M. Gel'fand, Dr Phys-Math Sci; and Prof A. I. Mal'cev, Dr Phys-Math Sci. Dissertation was published in "Trudy Moskovskogo Matematicheskogo Obshchestva"

243T94

(Works of the Moscow Mathematical Society), Vol 1 (1951), pp 39-166. A brief exposition appeared in "Doklady Akademii Nauk SSSR," 75 (1950) and 78 (1951).

243T94

PA 233T96

DYNKIN, YE. B.

USSR/Mathematics - Markov Stochastic  
Process

Nov/Dec 52

"Criteria of Continuity and of Absence of Discon-  
tinuities of Second Order for Trajectories of Markov  
Stochastic Process," Ye. B. Dynkin

"Iz Ak Nauk SSSR, Ser Matemat" Vol 16, No 6, pp 563-  
572

Establishes a connection between (a) order of de-  
crease for  $h \rightarrow 0$  of probability of making a transi-  
tion, in time  $h$ , greater than  $\epsilon$  and (b) conti-  
nuity of a process with probability of unity, and  
also (c) absence with probability unity of discon-  
tinuities more complex than jumps. Submitted by  
Acad A.N. Kolmogorov 15 May 52. Cites W. Feller,  
Trans Am Math Soc.

233T96

Semisimple subalgebras of semisimple Lie algebras, *Adv. Math.* 38 (1981), 349-462, 3 pages.

thorough study of the subject indicated by the most references are the following: the USSR and all the rest by the author "1. *Trudy SSSR Ser. Mat.* **9**, 143-74 (1944); see translation in **33**, these Rev. **6**, 146; *Acad. Book SSSR* **71**, 221-24 (1950); **75**, 315-336 (1950); **76**, 629-632 (1951); **81**, 987-990 (1951); these Rev. **11**, 492-123; **10**, 527-8; *Trudy Moskvy*, **11**, 60-62.

[illegible]

### Mathematical Reviews.

702

100

of the corresponding representations of the exceptional group  $G_2$  and in paper 5. The author also refers to the work on the exceptional groups and studies some associated questions. Much of the work is presented in 4. series which occupy about half the paper.

[illegible]

property is closely connected with the Theorem 7.1 asserts that in any representation of a semi-simple Lie algebra, there is a reducible set of matrices. Conversely any reducible subset is  $R$ -invariant and every subalgebra is integral. Chapter IV studies the dimensional subalgebras. The subalgebras of the exceptional rank 3 being that of Chapter III. The exceptional algebras are tabulated in the inserted sheets. In Chapter V the classification of the  $S$ -subalgebras (not

necessarily simple) is given in table 10. The appendixes to his previous work on classification of the representations of the Lie algebras are handled in tables 11-13.

Mathematical Reviews,

Vol 13 No. 1

DYNKIN, YE. B.

PA 227T57

USSR/Mathematics - Invariants, 1 Aug 52  
Topology

"Topological Invariants of Linear Representations of a Unitary Group," Ye.B. Dynkin

"Dok Ak Nauk SSSR" Vol 85, No 4, pp 697-699

Considers the linear unitary representations of the group  $U(n)$  of all unitary matrices of order  $n$  with determinant 1; that is, the homomorphic reflections  $U(n)$  in  $U(N)$ , which are studied here from the topological standpoint. Calculates their homological characteristics, which are shown to det an irreducible representation with an accuracy up

227T57

to equivalence, similar results being able to be obtained for homomorphic reflections of arbitrary classical groups some into others. Submitted by Acad A.N. Kolmogorov  
2 Jun 52.

227T57

DYNKIN, YE. B.

PA 245T76

USSR/Mathematics - Homologies

21 Nov 52

"The Connection Between the Homologies of a Compact Lie Group and Those of Its Subgroups," Ye. B. Dynkin

"Dok Ak Nauk SSSR" Vol 87, No 3, pp 333-336

Derives formulas that permit one to solve the problem of the homologousness to zero of subgroups of classical groups according to systems of weights which assign these subgroups of linear representations Submitted by Acad A. N. Kolmogorov 25 Sep 52.

245T76

DYNKIN, Ye. B.

Mar/Apr 53

USSR/Mathematics - Stochastics

"Classes of Equivalent Chance Quantities," Ye. B. Dynkin

Usp Mat Nauk, Vol 8, No 2(54), pp 125-130

Demonstrates a theorem that establishes a correspondence between sequences of equivalent chance quantities and distribution of probabilities in the space of distribution functions; this theorem permits one to derive the properties of classes of equivalent chance quantities from the well-studied properties of sequences of independent identically distributed quantities, permitting, e.g., derivation of limit theorems for sums of equivalent chance quantities. States that a discussion of A. Ya. Khinchin's works at the seminar under the author's guidance at Moscow Univ is the reason for the present work; N. N. Chentsov, R. L. Dbrushin, A. A. Yushkevich, V. A. Uspenskiy, and others participated.

250T89

DYNKIN, YE. B.

USSR/Mathematics - Topology

11 Jul 53

"Construction of Primitive Cycles in Compact Lie Groups," Ye. B. Dynkin

DAN SSSR, Vol 91, No 2, pp 201-204

Indicates a simple method for constructing collections of maximum linearly independent primitive classes of homologies. Amplifies H. Hopf's theorem, which reduces the study of homologies (over a field of zero characteristic) of compact Lie groups to the construction in these groups of such collections. Presented by Acad A. N. Kolmogorov 18 May 53.

276T73



holds where the  $E$  are the usual basic matrices. A similar

Dyckin, *ibid.* 87, 334-336 (1952); *ibid.* 14, 629

define the map of  $H_{\text{free}}(G)$  into  $S(A)$  as follows:

For the case that the space  $V$  is not finite-dimensional, the following theorem holds.

DYNKIN, Ye.B.

Certain limit theorems for Markov chains. Ukr.mat.zhur. 6 no.1:21-27  
'54. (Probabilities) (MLRA 9:1)





12921701-11  
/★ Dynkin, E. B.; und Uspenski, W. A. Mathematische  
—Obersetzungen. I. Mehrfarbenprobleme. 19015-011  
Verlag der Wissenschaften Berlin. 1971.  
DM 5.10  
Translation of part I (pp. 13-41) of

and Uspenski's Matematicheskie besedy (Lectures)  
Moscow 1952, MR 14 (4).

✓ Dynkin, E. B.; and Oniščik, A. I. Compact global Lie groups. *Uspehi Mat. Nauk* N.S. 19 (1964), no. 3, 3-74 (Russian).

*1120*  
The first purpose of the paper is to describe the diagram of a compact Lie group. (Stiefel, *Comment. Math. Helv.* 14 (1939), 375-379; MR 4, 134), but using now the Cartan-Weyl theory of root forms as the basis. In the diagram the centres of the simple Lie groups are determined. The result is stated in terms of the weights of the irreducible components of the representation of a compact Lie group on the symplectic or orthogonal representations.

Dynkin, E. B. On new analytic method  
Markov random processes.  
10 (1955), no. 11, 207-214.  
Expository paper, English.

SUBJECT USSR/MATHEMATICS/Theory of probability CARD 1/2 PG - 116  
 AUTHOR DYNKIN E.B.  
 TITLE Some limit value theorems for sums of independent random variables with infinite mathematical expectation.  
 PERIODICAL Izvestija Akad. Nauk, 19, 247-266 (1955)  
 reviewed 7/1956

Let  $\xi_1, \xi_2, \dots, \xi_n$  be a sequence of positive independent random variables with the same distribution function  $F(x)$ . Let  $\zeta_n = \xi_1 + \dots + \xi_n$  ( $n=1, 2, \dots$ ) be a sequence of sums.  $\nu_x$  denotes the number of sums  $\zeta_n$  which are smaller than  $x$ . Let be

$$\gamma'_x = \zeta_{\nu_x+1} - x, \quad \gamma''_x = x - \zeta_{\nu_x}, \quad \gamma_x = \gamma'_x + \gamma''_x = \xi_{\nu_x+1}.$$

The author investigates the limit distribution of the  $\gamma'_x, \gamma''_x, \gamma_x$  for  $x \rightarrow +\infty$  in the case that the mathematical expectations of the terms  $\xi_k$  are infinite (while the Renewal theory mostly computes with finite expectations). The principal result of the present paper is the following theorem: If for  $x \rightarrow \infty$  the distribution of  $\frac{\gamma'_x}{x}$  converges to a distribution with density  $p_\alpha(n)$ , then the common distribution of  $\gamma'_x, \gamma''_x$  converges to the two-dimensional distribution

Izvestija Akad. Nauk 19, 247-266 (1955)

CARD 2/2

PG - 116

with the density

$$p_{\alpha}(u, v) = \begin{cases} \alpha \frac{\sin \pi \alpha}{\pi} (1-v)^{\alpha-1} (u-v)^{-1-\alpha} & \text{for } 0 \leq u, 0 \leq v \leq 1 \\ 0 & \text{in all other cases} \end{cases}$$

and the distributions of the terms  $\chi^n(x)$  and  $\chi(x)$  correspondingly converge to the distributions with densities

$$q_{\alpha}(u) = \begin{cases} \frac{\sin \pi \alpha}{\pi} (1-v)^{\alpha-1} v^{-\alpha} & \text{for } 0 \leq v \leq 1 \\ 0 & \text{in all other cases} \end{cases}$$

$$r_{\alpha}(u) = \frac{\sin \pi \alpha}{\pi} u^{-1-\alpha} g(u)$$

where

$$g(u) = \begin{cases} 0 & \text{for } u \leq 0 \\ -1 \cdot (1-u)^{\alpha} & \text{for } 0 \leq u \leq 1 \\ 1 & \text{for } u \geq 1 \end{cases}$$

and

$$p_{\alpha}(u) = \begin{cases} \frac{\sin \pi \alpha}{\pi} u^{-\alpha} (1+u)^{-1} & \text{for } u > 0 \\ 0 & \text{for } u \leq 0 \end{cases} \quad (0 < \alpha < 1).$$

The author gives applications to processes with independent increases and considers the case of not necessarily positive terms  $\xi_k$ .

~~Hydrogen~~  
Dyckin, E. B. (1964)

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means  $\frac{1}{n} \sum C_i$  and pointwise add count of

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ences. The results are based to some extent on calculation.

SUBJECT USSR/MATHEMATICS/Theory of probability CARD 1/2 PG - 173  
 AUTHOR DYMKIN E.B.  
 TITLE Infinitely small operators of Markov random processes.  
 PERIODICAL Doklady Akad. Nauk 105, 206-209 (1955)  
 reviewed 7/1956

Let  $x(t) = x(t, \omega)$  ( $0 \leq t < \infty$ ,  $\omega \in \Omega$ ) be a measurable Markov process being homogeneous in  $t$  in the phase space  $E$ . Let  $B$  be the Banach space of all (according to Borel) measurable and bounded functions on  $E$  with the norm  $\|f\| = \sup |f(x)|$ . Let  $T_t f(x) = M_x [f(x(t))]$ , where  $M_x$  denotes the mathematical expectation,  $x(0) = x$ . The operators  $T_t$  form a one-parametric semigroup. If for  $f \in B$ :

$$\left\| \frac{T_t f - f}{t} - g \right\| \rightarrow 0,$$

then  $f$  belongs to the domain of definition  $D(A)$  of the infinitely small operator  $A$ , where  $Af = g$ . Let  $\tau$  be a random variable with non-negative values having the property: The conditional distribution of the probabilities of the random function  $y(t) = x(\tau+t)$  ( $t \geq 0$ ) relative to the system of random variables  $x(n)$  ( $n \geq \tau$ ) depends only on  $x(\tau)$  and for  $x(\tau) = x$  it is identical with the distribution of the random function  $x(t)$  with the condition  $x(0) = x$ . If for every neighborhood  $U$  of an arbitrary point  $x$  the random variable  $\tau_U$  has this property, then the process is called a strong Markov process. For such processes

Doklady Akad.Nauk 105, 206-209 (1955)

CARD 2/2 PG. 173

it is proved: If the function  $Af(x)$  is continuous in the point  $x$  and if for a certain neighborhood  $U^0$  of the point  $x$  there is  $M_U C_U$  such that there holds:

$$Af(x) = \lim_{d(U) \rightarrow 0} \frac{M_x f[x(\mathcal{C}_U)] - f(x)}{M_x C_U}.$$

Under some additional conditions, from these formulas the results of Itô and Yosida on invariant continuous processes on Riemannian manifolds can be derived. A process is called a Feller process if the space  $C$  of all (on  $E$ ) continuous bounded functions is invariant with respect to the operators  $T_t$  and for every  $f \in C$ :  $\|T_t f - f\| \rightarrow 0$  for  $t \rightarrow 0$ . It is proved: If the space  $E$  is compact and if  $x(t)$  is a Feller process, then the domain of definition  $D(A)$  of the infinitely small operator  $A$  consists of all functions for which there exists the limit value

$$\lim_{d(U) \rightarrow 0} \frac{M_x f[x(\mathcal{C}_U)] - f(x)}{M_x C_U}$$

and is continuous with respect to  $x$ . This limit value equals  $Af(x)$ . Some well known results of Feller (Ann. of Math. 60, 61) are derived in a somewhat changed form.

INSTITUTION: Lomonossov University, Moscow.

SUBJECT USSR/MATHEMATICS/Theory of probability CARD 1/1 PG - 156  
 AUTHOR DYNKIN E.B.  
 TITLE Continuous one-dimensional Markov processes.  
 PERIODICAL Doklady Akad. Nauk 105, 405-408 (1955)  
 reviewed 7/1956

The author computes the infinitely small operator of the one-parametric semigroup of the operators  $T_t$  (compare Dynkin, Doklady Akad. Nauk 105, 206-209 (1955)) in a suitably constructed subspace  $H$  of the Banach space  $B$ . The corresponding infinitely small operator defines uniquely a continuous process. The consideration does not use Feller's assumption (Ann. of Math. 60, 61 (1954)) that the semigroup  $T_t$  lets invariant the space  $C$  of all functions being continuous on  $E$ , and bases on a classification of the points of the phase space and a very complicatedly defined auxiliary operator as the construction of which the infinitely small operator appears. Analogous Feller's results seem to be more general (Ann. of Math. 55, 77 (1952)).

DYNKIN, Ye.B. (Moskva)

Markov processes and operator semi-groups [with summary in  
English]. Teor. veroiat. i ee prim. no.1:25-37 '56. (MLBA 9:12)

(Operators (Mathematics))  
(Probabilities)

DYMKIN, Ye.B. (Moskva).

Infinitesimal operators of Markov processes [with summary in English]. Teor.veroiat.i ee prim. no.1:38-60 '56. (MLRA 9:12)

(Probabilities)

DYMKIN, Ye.B. (Moskva); YUSHKEVICH, A.A. [Jushkevich, A.].

Strong Markov processes [with summary in English]. Teor.  
veroiat. i ee prin. no.1:149-155 '56. (MLRA 9:12)

(Probabilities)

DYNKIN, Ye.B. (Moscow); GIRSANOV, I.V. (Moscow)

Nineteenth mathematics contest for Moscow schools. Mat. pros. no.1:  
187-194 '57. (MIRA 11:7)  
(Moscow--Mathematics--Competitions)

ZAIGALLER, V.A. (Leningrad); OSTROVSKIY, A.I. (Moscow); NOVIKOVA, V.S.  
(Orekhovo-Zuyevo); ZHAROV, V.A. (Yaroslavl'); SVOBODA, A.  
(Chekhoslovakiya); DYNKIN, Ye.B. (Moscow); BALASH, E.E. (Moscow)

Problems of elementary mathematics. Mat. pros. no.1:219-224 '57.  
(MIRA 11:7)  
(Mathematics--Problems, exercises, etc.)

TANATAR, I.Ya. (Moscow); SKOPETS, Z.A. (Yaroslavl'); ARNOL'D, V.I.  
(Moscow); DYHKIN, Ya.B. (Moscow); LORDKIPANIDZE, B.G. (L'vov);  
KONSTANTINOV, N.H. (Moscow); BEREZIN, P.A. (Moscow)

Problems of elementary mathematics. Mat. pros. no.2:267-270 '57.  
(MIRA 11:7)

(Mathematics--Problems, exercises, etc.)

~~LEVIN~~ DYNKIN, Ye. B.  
BALK, M.B. (Smolensk); DUBNOV, Ya. S. (Moscow); PYATETSKIY-SHAPIRO,  
I.I. (Kaluga); VILENKIN, N. Ya. (Moscow); BALASH, E.E. (Moscow);  
LEVIN, V.I. (Moscow); DMITRIYEV, N.A. (Moscow); DYNKIN, Ye. B.  
(Moscow); NAYMARK, B.A. (Moscow); GEL'FAND, I.M. (Moscow)

Problems of higher mathematics. Mat. pros.no.2:270-274 '57.  
(MIRA 11:7)

(Mathematics--Problems, exercises, etc.)

AUTHOR

DYNKIN E.B.

PA - 3005

TITLE

Unhomogeneous Strong Markov Processes.

(Neodnorodnyye strogo markovskiyye protsessy , -Russian)

PERIODICAL

Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 2, pp 261-263, (U.S.S.R.)

Received 6/1957

Reviewed 6/1957

ABSTRACT

The present paper investigates the concept of strict Markov processes without the hypothesis of homogeneity of the process with regard to time. A MARKOV's process is defined by the following elements: 1) Interval  $I$  of the number line. 2) Complex  $E$  (phase space) of a certain  $\sigma$ -algebra  $\mathcal{F}$  of the subcomplexes of  $E$ . 3) Complex  $\Omega$  (a complex of elementary phenomena). 4) Function  $x(t, \omega)$  ( $t \in I, \omega \in \Omega$ ) with values from  $E$ . 5) A system of probability measures  $P_{s,x}$  ( $s \in I, \omega \in E$ ). The measure  $P_{s,x}$  is already given on the  $\sigma$ -algebra  $M_s^x$ , which is produced by the  $\omega$ -complexes  $\{x(t, \omega) \in \Gamma\}$  ( $t \in I, t \geq s, \Gamma \in \mathcal{F}$ ). Moreover this measure is sufficient to the condition  $P_{s,x} \{x(s, \omega) = x\} = 1$ .

Then the strict processes Markov (in the first and second sense) are defined. In addition the following theorems are given: 1. Theorem: Let  $x(t, \omega)$  in the first sense be a process strictly in the kind of MARKOV. Let  $\mathcal{T} \leq$  be an incidental quality, independent from the future and the  $s$ -past. Let  $\{(\omega)\}$  be a function measurable as to  $M_t^x$  of the kind that  $M_{s,x} \left\{ \int_{\mathcal{Q}} \right\}$

$(\omega) P_{s,x}(d\omega)$  exists. Then for nearly all  $\omega$  (in the sense of  $P_{s,x}$ ) the relation  $M_{s,x} \left\{ \int_{\mathcal{T}} |x_u|, s \leq u \leq \mathcal{T} \right\} = M_{\mathcal{T},x} \left\{ \int_{\mathcal{T}} |x_u|, s \leq u \leq \mathcal{T} \right\}$  here

Card 1/2

Unhomogeneous Strong Markov Processes.

PA - 3005

denotes the conditioned mathematical expectation as to the  $\mathcal{G}$ -algebra  $M_{\tau}$ .

2.Theorem: concerns processes strictly in the kind of MARKOV in the second sense. This theorem, too, is given exactly.

3.Theorem: A MARKOV process continuous from the right side is only strictly in the kind of MARKOV in the first sense, if it is strictly in the kind of MARKOV in the second sense.

4.Theorem: Let  $x(t, \omega)$  ( $0 \leq t < \infty$ ,  $\omega \in \Omega$ ) be a MARKOV process continuous from the right side, which satisfies the condition  $(J_2)$ . For such process being strictly in the kind of MARKOV it is sufficient that the condition  $(S_2)$  is fulfilled for  $\tau = \tau + h$ .  $h$  here denoted any non-negative constant.

5.Theorem: If a Markov's process is continuous from the right side and the conditions  $(J_1)-(F_1)$  or  $(J_2)-(F_2)$  are fulfilled, it a strict MARKOV process.

ASSOCIATION	National University of Moscow
PRESENTED BY	KOLMOGOROV A.N., Member of the Academy
SUBMITTED	11.12.1956
AVAILABLE	Library of Congress
Card 2/2	

Ye. B. Dyukhin,

16(1)  
- AUTHOR:

TITLE:

PERIODICAL:

ABSTRACT:

- Cherny, I.A., University Lecturer, and  
Kopylov, V.D., Scientific Assistant  
Lectures 1957 at the Mechanical-Mathematical  
Faculty of Moscow State University (Gosmorisit'skoye  
uchebnaya 1957 goda na mekhaniko-matematicheskoy fakul'tete  
MSU)  
Vestnik Moskovskogo Universiteta. Seriya matematiki, mekhanika,  
astronomiya, fizika, khimiya, 1958, No. 4, pp. 241-246 (USCH)  
The Lomonosov lectures 1957 took place from October 17 -  
October 21, 1957 and were dedicated to the 40-th anniversary  
of the October Revolution.  
16. A.D. Gorbunov, Lecturer and A.M. Budak, Lecturer,  
Difference Methods for the Solution of Hyperbolic  
Equations.  
17. M.G. Babalov, Number of Calculation Operations for  
the Solution of Elliptic Equations.  
18. V.I. Kuznetsov, Aspirant, Difference Method for the  
Solution of the Navier-Stokes System.  
19. Professor Ye.B. Dyukhin, Senior Professor and Semigroups.  
20. A.G. Kostyukovich, Lecturer, Senior Physical-Mathematical  
Science, Decomposition of Diffusion Operators With  
Respect to Generalized Eigenfunctions of Diffusion Operators With  
21. P.A. Jerosin, Candidate of Physical-Mathematical Sciences,  
Foundations of the Theory of Spherical Harmonics on Mani-  
folds.  
22. I.M. Borok, Aspirant, General Properties of Partial  
Differential Systems.  
23. M.A. Ekmanskiy, Candidate of Physical-Mathematical  
Science, On Constructive Mathematical Analysis.  
24. P.I. Ginzburg, Lecturer, Several of Terms in Trigonometric Series.  
25. I.G. Petrovskiy, Academician and Ye.M. Landis, Senior  
Scientific Assistant, On the Number of Boundary Cycles  
of a Differential Equation of First Order With a Rational  
Right Side.  
The contents of all the lectures have already been published.

Card 5/5

(12)

52-III-1-2/9

AUTHOR: Dynkin, Ye. B. (Moscow)

TITLE: Markov Jump Processes. (Skachkoobraznyye Markovskiye protsessy.)

PERIODICAL: Teoriya veroyatnostey i yeye primeneniya, 1958, Vol.III, Nr.1, pp.41-60. (USSR).

ABSTRACT: In this paper infinitesimal operators of all jump processes are calculated. A Markov process  $x(t, \omega)$  ( $t \geq 0, \omega \in \Omega$ ) on a measurable space  $(\mathcal{E}, \mathcal{B})$ , is called a jump process if for every  $\omega \in \Omega$  and  $t \geq 0$  there exists an  $\varepsilon > 0$  such that  $x(t, \omega) = x(t + h, \omega)$  for all  $h \in [0, \varepsilon)$ . The space  $(\mathcal{E}, \mathcal{K})$  is the phase space of the space  $\Omega$  of elementary events. The function  $x(t, \omega)$  ( $t \geq 0, \omega \in \Omega$ ) takes values from  $\mathcal{E}$ . The phase space is an arbitrary measurable space, i.e. a pair consisting of an abstract set  $\mathcal{E}$  and the  $\sigma$ -algebra of its subsets  $\mathcal{B}$ ; the space of elementary events is an arbitrary set. The system of probability measures  $P_x(x \in \mathcal{E})$  in the space  $\Omega$  is defined on the  $\sigma$ -algebra generated by the sets  $\{\omega: x(t, \omega) \in \Gamma\}$  ( $t \geq 0, \Gamma \in \mathcal{B}$ ) and satisfies the compatability condition formulated below.

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1/4

Markov Jump Processes.

52-III-1-2/9

The conditional probabilities with respect to the  $\sigma$ -algebra generated by the sets  $\{\omega: x_t \in \Gamma\}$  ( $t \leq \tau, \Gamma \in \mathcal{B}$ ) are denoted by the symbol  $P_x(\dots | x_t, t \leq \tau)$ . These conditional probabilities satisfy the compatibility relation

$$P_x(x_{\tau+t_1} \in \Gamma_1, \dots, x_{\tau+t_n} \in \Gamma_n | x_t, t \leq \tau) = \\ = P_{x_\tau}(x_{t_1} \in \Gamma_1, \dots, x_{t_n} \in \Gamma_n). \quad (\text{Eq.0.1})$$

Various special classes of jump processes have been studied by Feller (Ref.13,14), Doeblin (Ref.10), Dubrovskiy (Ref.5,6) and Doob (Ref.11). Recent papers by Feller (Ref.15) and Dobrushin (Ref.1) have been devoted to similar problems, and a class of processes with a countable set of states, not including all jump processes but containing some processes of a more complicated type, have been described. In this paper the author discusses the random quantities  $\tau_\alpha$  and  $x_\alpha$  where  $\alpha$  belongs to the set  $N$  of all transfinite numbers.

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52-III-1-2/9

Markov Jump Processes.

The analytical form of the infinitesimal operator is introduced, and two methods are given of describing the domain of definition of the infinitesimal operator. The first of these methods leads to a more simple formulation, the second gives a significant revelation of the structure of an arbitrary jump process. It makes it possible to survey the class of all jump processes corresponding to given functions  $a(x)$  and  $P_x\{x_1 \in \Gamma\}$ . It can be shown that the infinitesimal operator and hence the transition probabilities of a jump process are completely defined if, in addition to the functions  $a(x)$  and  $P_x\{x_1 \in \Gamma\}$ , are given for each resolvable countable transfinite number  $\gamma$  a set  $\{\omega: \tau_\gamma(\omega) < +\infty\}$ , the  $\sigma$ -algebra  $\mathcal{R}_\gamma$  of its subsets and the  $\mathcal{R}_\gamma$  measurable function

Card  
3/4

$$\pi_\gamma(\omega, \Gamma) = P_x\{x_\gamma \in \Gamma | \mathcal{R}_\gamma\}. \quad (\omega \in \Omega_\gamma, \Gamma \in \mathcal{B}).$$

Markov Jump Processes.

52-III-1-2/9

It follows that all jump processes corresponding to the functions  $a(x)$  and  $P_x\{x_1 \in \Gamma\}$  can be constructed by an induction process, and at each step it is only necessary to choose the function  $\pi_\gamma(\omega, \Gamma)$ . This function must be measurable with respect to  $\mathcal{R}_\gamma$  and satisfy the condition

$$\pi_\gamma(\omega, \delta) \approx 1.$$

It can be proved that the choice is not restricted in any other way. There are 15 references, of which 9 are Soviet, 4 English, 1 French and 1 German.

SUBMITTED: October 2, 1957.

AVAILABLE: Library of Congress.

1. Markov processes
2. Topology
3. Algebraic functions

Card 4/4

DYNKIN, Ye. B.

SOV/52-3-2-10/10

AUTHOR: None Given

TITLE: A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958 (Rezyume dokladov, sdelaynykh na zasedaniyakh nauchno-issledovatel'skogo seminaru po teorii veroyatnostey, Moskva, sentyabr'-mart 1957-58 g.)

PERIODICAL: Teoriya veroyatnostey i yeye primeneniya, 1958, Vol III, Nr 2, pp 212-216 (USSR)

ABSTRACT: A. N. Kolmogorov - Ergodic stationary random processes with a discrete spectrum. If  $S$  is a set of numbers and  $\xi(t)$  is a stationary ergodic function defined for all random values of  $t$  as

$$\xi(t) = \sum_{\lambda \in S} \varphi(\lambda) e^{i\lambda t}$$

then  $\rho(\lambda) = |\varphi(\lambda)|^2$  is not random. Therefore, the unit probability can be expressed as  $\rho(\lambda) = +\sqrt{f(\lambda)} > 0$  and  $\varphi(\lambda) = \rho(\lambda) e^{i\theta(\lambda)}$  where  $\theta(\lambda)$  is defined as mod  $2\pi$

Card 1/6 and represents a random element of the space  $A_S$  of all the

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A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958

functions  $\alpha(\lambda)$ . The space  $A_S$  represents a compact group with a sub-group  $B_S$ . The factorial group

$\Gamma_S = A_S - B_S$  will determine the distribution of

the function  $\xi(t)$  becoming isomorphic of the other two. Ye. B. Dynkin - Infinitesimal operators of "jump" Markov processes. Published in Vol III, Nr 1 of this journal.

V. A. Volkonskiy - A random change of time in strictly Markov processes. If  $x_t = x(t, \omega)$  is a homogeneous Markov process on the space  $\mathcal{E}$  and  $\tau_t(\omega)$  is a function non-decreasing at all  $\omega$ , and that  $\tau_t(\omega)$  at all  $t$  is a random value not dependent on future, then the function  $y(t, \omega) = x(\tau_t(\omega), \omega)$  is a process obtained from  $x_t$  with random change of time  $\tau_t$ . At some conditions of  $\tau_t$  the

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A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958

the process  $y_t$  becomes a homogeneous strictly Markov process. In the case of a homogeneous process with a random change of time and a uniform deformation of space it is possible to obtain any continuous Markov process which will be regular in the interior and absorbed near the boundary.

R. L. Dobrushin - A statistical problem of detecting a signal in the noise of a multi-channel system reduced to stable distribution laws. Published in this issue.

V. M. Zolotarev - Some new properties of stable distribution laws. Published in Vol II, Nr 4 of this journal.

R. A. Minlos - On the extension of the generalized random process to additive measure. Any exact process, such as Gelfand's, based on the cylindrical set of numbers on linear topologic space  $E'$  and extended into a space  $E$  will retain its additive property defined as the set  $B$  on the space  $E'$ . (There are 2 references, 1 Soviet and 1 French).

D. M. Chibisov - Limit distribution for the number of runs in a Bernoulli Trials. If  $k$  represents a number of independent runs in two trials, the probability of a positive

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SOV/52-3-2-10/10

A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958

trial being  $p$  and a negative trial being  $q = 1 - p$ , then at  $i$ -run ( $i \geq r$ ) a series  $r$  can be found:  $i-r+1$ ,  $i-r+2$  ... The trial ( $i$ ) will be positive and the trial ( $i-r$ ) negative ( $i \geq r + 1$ ). The number of series  $r$  is  $N$ . The conditions for  $p$ ,  $q$ ,  $r$ ,  $k \rightarrow \infty$  are given by (1) (2) and (3).

A. N. Kolmogorov - Spectra for dynamical systems generated by the stationary stochastic process. Displacements of a trajectory on the space of a random stationary process generate the dynamic systems for which the probability distribution is invariant. If the process is normal then the spectra of dynamical systems are homogeneous. In the case of discrete time its multiple for a separable process can be calculated. For the continuous time only some examples of calculated multiple are known. The above can be illustrated by the entropy per unit of time considered as a metric invariant of a dynamical system. As in the case of discrete

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A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958

time a normal process with a short multiple spectrum can be defined also for a continuous duration of entropy. Therefore a solution can be obtained for a problem in metric theory of dynamical system existing as a transitory set of the non-spectral invariant.

I. V. Girsanov - Some examples of dynamical systems with a continuous spectrum. If  $x(t, \omega)$  is a substantial Gaussian process and  $F(dx)$  is its continuous spectrum, then the displacement  $S_t x(t, \omega)$  retains its value on the space of

trajectory, thus defining a certain dynamical system. The system is related to a group of the unitary operators  $U^t$  on the Hilbert space  $H$  which describes the substantial functionals of trajectory. The spectrum of the group  $U^t$  is described by the maximum  $\rho$  and the multiple function  $\nu(x)$ .

It has been proved that  $\rho = \sum F^i$  where  $F^i$  represents  $i$ -composition of  $F$ . If  $X$  is a complete numerical set,  $F_0$  a continuous value having  $X$  as its carrier, then the

Card 5/6 spectral process  $F(dx) = F_0(dx)$  has a single spectrum with

SOV/52-3-2-10/10  
A Summary of Papers Presented at the Sessions of the Scientific  
Research Seminar on the Theory of Probability, Moscow, September-  
March 1957-1958

the maximum  $\rho$ . The cyclic vector on  $H$  can be described  
as a series of stochastic integrals. In the case of  
 $F(dx) = F_0(dx) + F_0^2(dx)$  the process has the same maximum  $\rho$

but the spectrum will not be simple. Generally, it can be  
stated that: if a spectrum  $F$  of a process  $x(t, \omega)$  has a  
definite value then the spectrum of a dynamical system  
defined by this process contains only single components.

M. G. Shur "Ergodic properties of invariant Markov chains  
on homogeneous spaces". Published in this issue.

B. A. Sevast'yanov "Branching stochastic processes for  
particles diffusing in a restricted domain with absorbing  
boundaries". Published in this issue.

B. A. Rogozin "Some problems in the field of limit theorems".  
Published in this issue.

V. Sazonov "On characteristic functionals". Published in this  
issue.

Card 6/6 There are 2 references, 1 Soviet, 1 English.

USCOMM-DC-60370

GAL'PERN, S.A. (Moskva); LOPSHITS, A.M. (Moskva); BALK, M.B. (Smolensk);  
ZHAROV, V.A. (Yaroslavl'); BYAKIN, V.I. (L'vov); ARIZOL'D, V.I.  
(Moskva); MANIN, I.Yu. (Moskva); DYNKIN, Ye.B. (Moskva); PROIZ-  
VOLOV, V. (Moskva); ALEKSANDROV, A.D. (Leningrad); VITUSHKIN, A.G.  
(Moskva).

Problems of elementary mathematics. Mat. pros. no.3:267-270 '58.  
(Mathematics--Problems, exercises, etc.) (MIRA 11:9)

16(1)

PHASE I BOOK EXPLOITATION

SOV/3337

Dynkin, Yevgeniy Borisovich

Osnovaniya teorii markovskikh protsessov (Fundamentals of the Theory of the Markov Processes) Moscow, Fizmatgiz, 1959. 227 p. (Series: Teoriya veroyatnostey i matematicheskaya statistika). 5,000 copies printed.

Ed.: A.A. Yushkevich; Tech. Ed.: K.F. Brudno.

PURPOSE: This book is intended for students taking advanced mathematics courses and for scientific workers and mathematicians specializing in the field of probability theory and related fields.

COVERAGE: It is stated that this is the first book containing a systematic construction of the general theory of Markov processes including study of the properties of boundedness and continuity of the trajectories of Markov processes. The material in this book was presented by the author in a number of courses he taught at Moscow and Peking Universities, and the author thanks his former students for their criticisms and remarks. The author also thanks A.A. Yushkevich. There are 30 references: 13 Soviet, 15 English, 1 German, and 1 French.

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AVAILABLE: Library of Congress (QA273.D9)	

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4-22-60

DYNKIN, Ye. B.

PHASE I BOOK EXPLOITATION

SOV/3882

Matematika v SSSR za sorok let, 1917-1957, tom 2: Biobibliografiya  
(Mathematics in the USSR for Forty Years, Vol 2: Biobibliography) Moscow,  
Fizmatgiz, 1959, 819 p. Errata slip inserted. 6,000 copies printed.

Eds.: A. G. Kurosh (Chief Ed.), V. I. Bitvutskov, V. G. Boltyanskiy, Ye. B.  
Dynkin, G. Ye. Shilova, and A. P. Yushkevich; Tech. Ed.: S. N. Akhlamov.

PURPOSE: This book is intended for mathematicians and science historians.

COVERAGE: This is the second of a two-volume work. It contains contributions  
of Soviet mathematicians for the period 1917-1957 and was compiled by  
Yu. A. Gor'kov. Ke. Ye. Chernin wrote the part pertaining to the approxi-  
mation method and "machine" mathematics. This includes bibliographic  
material from "Mathematics in the USSR for 15 Years" and "Mathematics in  
the USSR for 30 Years". A significant part of the bibliographic material  
has been checked against lists of works sent to the editor by various  
scientists. The authors are presented in alphabetical order, while the  
works of each author are arranged chronologically. At the end of the book  
is a list of the basic mathematical journals of the world. Some 22,000  
titles of works of more than 3,600 authors are given (in "Mathematics in  
the USSR for 30 Years", there are about 7,000 works and 1,300 authors).

DYNKIN, Ye. B.

16(0) PHASE I BOOK EXPLOITATION SOV/3177  
 Matematika v SSSR za sorok let, 1917-1957, tom 1: Obzoruyaya statistika  
 (Mathematics in the USSR for Forty Years, 1917-1957), Vol. 1.  
 Moscow, Fizmatgiz, 1959. 1002 p. 5,500 copies  
 printed.  
 Eds: A. G. Kurosh, (Chief Ed.), V. I. Buzynskov, V. G. Bol'shakov,  
 Ye. B. Dynkin, G. Ye. Shilova, and A. P. Yunkovich; Ed (Inside  
 book): A. P. Laptov; Tech. Ed.: S. M. Akhmanov.  
 PURPOSE: This book is intended for mathematicians and historians  
 of mathematics interested in Soviet contributions to the field.

CONTENTS: This book is Volume I of a major 7-volume work on the  
 history of Soviet mathematics. Volume I surveys the work on the  
 contributions made by Soviet mathematicians during the chief years  
 1917-1957. Volume II will contain a bibliography of major works since  
 1957, and biographic sketches of some of the leading mathematicians  
 of the USSR. This work follows the tradition of the leading mathematicians  
 of the USSR for 40 years. Matematika v SSSR za tridtsat' let  
 (Mathematics in the USSR for 30 Years). The book is divided  
 into the main divisions of the field, i.e., algebra, topology,  
 theory of probabilities, functional analysis, etc., and con-  
 tributions and outstanding problems in each division. A list-  
 ing of some 1400 Soviet mathematicians is included with refer-  
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DYNEIN, Ye.B. (Moscow)

Continuous one-dimensional strictly Markov processes. Teor. veroiat. i ee  
prim. 4 no.1:3-54 '59. (MIRA 12:3)  
(Probabilities)

16(1)

AUTHOR:

Dynkin, Ye.B.

SOV/20-127-1-3/65

TITLE:

Natural Topology and Excessive Functions Connected With Markov's Process

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 17 - 19 (USSR)

ABSTRACT:

The notions of excessive functions (see Hunt [Ref 1] and of natural topology (see H. Cartan [Ref 4] and Doob [Ref 2, 3]) are introduced by the author in a new way. Let  $X = (x_t, \zeta, M_t, P_x, \theta_x)$  be a Markov process in the measurable space  $(E, B)$ ; let the condition  $P_x\{\zeta > 0\} = 1$  be satisfied for all  $x \in E$  (the terminology of the author from [Ref 5, 6] is used). Let  $\Gamma \in B_0$ , if  $\Gamma \in B$  and  $P_x\{it \text{ exists a } \delta \text{ so that } x_t \in \Gamma \text{ for all } 0 \leq t < \delta\} = 1$ . The system of sets being representable as sum of sets from  $B_0$  is assumed to be  $C_0$ . The pair  $(E, C_0)$  is a topological space. The topology  $C_0$  is denoted as natural topology connected with  $X$ . Let  $\tau(\Gamma) = \inf\{t : t > 0, x_t \in \Gamma\}$ ,  $\Gamma \in B$ . The set of

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Natural Topology and Excessive Functions Connected  
With Markov's Process

S07/20-127-1-3/65

the points in which  $P_x \{x(\Gamma) > 0\} = 0$  is denoted  $\Gamma_r$ .

Let  $\hat{\Gamma} = \Gamma \cup \Gamma_r$ . Restricting himself to special rigorous Markov processes which are continuous from the right (so-called standard processes) the author gives the following theorems:

Theorem:  $\Gamma_r$  is closed in the topology of  $C_0$ .  $\hat{\Gamma}$  is the closure of  $\Gamma$  in the topology of  $C_0$ .

Theorem: The sets of the type  $E \setminus G_r$ , where  $G \in C$ , form a basis of the topology  $C_0$ .

Then excessive functions are introduced, their properties are treated (the excessive functions are nonnegative; the boundary value of a nondecreasing sequence of excessive functions is excessive etc.), and two theorems on the excessive functions of rigorous Markov and strong Feller processes are formulated. In the last theorem 5 the author

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Natural Topology and Excessive Functions Connected With Markov's Process SOV/20-127-1-3/65

treats the connection between the natural topology and the excessive functions.

Theorem : Let  $X$  be a Markov standard process. All functions excessive for  $X$  are continuous in the topology  $C_0$ . The topology  $C_0$  can be denoted as the weakest topology in which all excessive functions are continuous for  $X$  and for arbitrary substandard processes  $\tilde{X}$ .

A.D. Ventsel' and I.V. Girsanov (Moscow University) are mentioned.

There are 7 references, 3 of which are Soviet, 3 American, and 1 French.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

PRESENTED: February 21, 1959, by P.S. Aleksandrov, Academician

SUBMITTED: February 19, 1959

Card 3/3

ITO, Kiyosi [ITO, Kiyoshi]; VENTTSEL', A.D. [translator]; VHRBA, S.A.  
[translator]; DYNKIN, Ye.B., red.; AGRANOVICH, M.S., red.;  
IOVLEVA, N.A., tekhn.red.

[Probability processes] Veroiatnostnye protsessy. Pod red.  
E.B.Dynkina. Moskva, Izd-vo inostr.lit-ry. No.1. 1960. 133 p.  
Translated from the Japanese. (MIRA 14:1)  
(Probabilities)

Dyrkin, Ye. B.

STAFF : BOB WICKSTON

Современные по теории вероятностей и математической статистике, Яервум, 1955

Trudy Vsesoyuznogo sveshcheniya po teorii veroyatnostey i matematicheskoy statistike, 19-25 sentyabrya 1955 g. (All-Union Conference on the Theory of Probability and Mathematical Statistics. Held in Yermum 19-25 September, 1955. Translations.) Yermum, izd-vo AN SSSR, 1960. 591 p.

Reprint, 1962. 2,500 copies printed.

Source of Agency: Agricultural Bank Agency-592.

**Editorial Staff:** G.A. Ashtaryan, D.V. Gnedenko, Ye.B. Dyukin, Yu.V. Linnik and  
M.I. Shchegolev; **Technical Editor:** A.G. Glavin; **Proofreader:** M.A. Kopylov.

**REMARK.** The book is intended for mathematicians.

[illegible]

210	Berry, A.G. Application of Mathematical Statistics to Problems in Automation of Machinery-Construction Plants
223	Snyder, Jo. B. Markov's Processes and their Subprocesses
256	Tentzel, A.D. On Local Behavior of Trajectories of Diffusion Processes
279	Furberich, A.A. Some Properties of Markov's Processes with an Enumerable Set of States
287	Gilman, I.I. On the Problem of the Number of Intersections of a Random Function with the Boundary of a Given Domain
283	Ishimizu, H.I. Isotropic Markov-Type Random Fields in Euclidean and Hilbert Spaces
280	Cantow, E. M. Limit theorems for some classes of Random Functions
286	Dreger, L. A. Some limit theorems for Strictly Stationary Processes, (Notes)
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72	Erdős, Pa.L. Some Properties of Stochastic Pulse Processes
79	Shoroboff, A.V. Random Measures and their Applications in the Theory of Stochastic Processes and Statistics. (Theses)
85	Cantow, E.E. Topologic Measures and the Theory of Random Functions
88	Kloeden, R.P. On Evaluation of a Distribution Function Based on the Simulation of a Stationary Process
96	Vilka, E.I. On One Problem of a Random Walk. (Theses)

86019

S/052/60/005/004/004/007  
C 111/ C 333

16.6100

AUTHOR: Dynkin, Ye. B.

TITLE: Additive Functionals of a Wiener Process Determined by Stochastic Integrals

PERIODICAL: Teoriya veroyatnostey i yeye primeneniye, 1960, Vol. 5, No. 4, pp. 441-452

TEXT: The author uses the notations of (Ref.1). A Markov process is defined to be a set of elements  $X = (x_t, \xi, \mathcal{M}_t^s, P_{s,x})$ , where  $x(t) = x_t(\omega)$  ( $0 \leq t \leq \xi(\omega)$ ) is the trajectory of the process which corresponds to the elementary event  $\omega$ ,  $\mathcal{M}_t^s$  is the set of the events observed in the time  $[s, t]$ ,  $P_{s,x}(A)$  is the probability of  $A$ , if at the moment  $s$  the trajectory was in the point  $x$ .  $X$  is considered in the phase space  $(E, \mathcal{B})$ . Let the  $\sigma$ -algebras  $\mathcal{M}_s$  on which the measures  $P_{s,x}$  are defined be complete. Let the algebras  $\bar{\mathcal{M}}_t^s$ ,  $\mathcal{N}^s$  and  $\bar{\mathcal{N}}^s$  be defined as in (Ref.1). Let  $\mathcal{R}_t^s = \bar{\mathcal{M}}_t^s \cap \bar{\mathcal{N}}^s$ . The function  $\varphi_t^s(\omega)$  ( $0 \leq s \leq t < \xi(\omega)$ ) with values from  $(-\infty, \infty)$  is called almost additive functional of  $X$ , if 1A. for all  $0 \leq s \leq t$

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Additive Functionals of a Wiener Process Determined by Stochastic Integrals

the function  $\varphi_t^s(\omega)$  is  $\mathcal{B}_t^s$ -measurable. 2B For all  $0 \leq s \leq t \leq u$ ,  $x \in E$  it holds  $\varphi_t^s + \varphi_u^t = \varphi_u^s$  (almost sure on  $\Omega_u$  relative to the measure  $P_{s,x}$ ). Two almost additive functionals  $\varphi_t^s$  and  $\tilde{\varphi}_t^s$  are called equivalent, if  $P_{s,x} \{ \varphi_t^s = \tilde{\varphi}_t^s \} = 1$  for all  $0 \leq s \leq t$  and  $x \in E$ . An almost additive functional  $\varphi_t^s$  is called additive, if: 1B':  $\varphi_t^s(\omega) + \varphi_u^t(\omega) = \varphi_u^s(\omega)$  for all  $\omega \in \Omega$ ,  $0 \leq s \leq t \leq u$ .

Theorem 1: Let an almost additive functional  $\varphi_t^s$ , which is continuous to the right satisfy the condition 1C:  $\varphi_s^s = 0$  (almost sure on  $\Omega_s$  relative to  $P_{s,x}$ ) for all  $0 \leq s$ ,  $x \in E$ . Then there exists an additive functional  $\tilde{\varphi}_t^s$  which is continuous to the right and equivalent to  $\varphi_t^s$ . If  $\varphi_t^s$  is continuous, then  $\tilde{\varphi}_t^s$  can be chosen to be continuous too.

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Additive Functionals of a Wiener Process Determined by Stochastic Integrals

Then the author considers stochastic integrals

$$(1) \int_s^t \phi(u, \omega) dx_n$$

which are related to an n-dimensional Wiener process. The integrals are defined relative to a measure  $P_{s,x}$  and therefore depend in general on x. The author gives conditions under which the values of (1) do not depend on x. The results are used in order to construct additive functionals of Markov processes with the aid of stochastic integrals.

There are 6 references: 2 Soviet, 2 American, 1 Japanese and 1 German.

[Abstracter's note: (Ref.1) is the book of Ye. B. Dynkin: Foundations of the Theory of Markov Processes, Moscow, 1959]

SUBMITTED: January 18, 1960

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DYNKIN, Ye.B.

Markov processes and problems of analysis connected with them.  
Usp. mat. nauk 15 no.2:3-24 Mr-Apr '60. (MIRA 13:9)  
(Probabilities)

*DYN KIN, YE.B.*

S/020/60/133/02/05/068  
C111/C222

AUTHOR: Dynkin, Ye.B.

TITLE: Some Transformations of Markov Processes <sup>16</sup>

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 2, pp. 269-272

TEXT: A short description of the class of transformations considered in the present note was already given in (Ref. 3). A detailed representation of the results is contained in the Proceedings of the Fourth Berkeley Symposium on Mathematical Statistics and Probability. There are 5 references : 4 Soviet and 1 American.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova  
(Moscow State University imeni M.V. Lomonosov)

PRESENTED: March 16, 1960, by A.N. Kolmogorov, Academician

SUBMITTED: March 11, 1960

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B

DYNKIN, Ye.B.; MALYUTOV, M.B.

Random wandering on groups having a finite number of generatrices.  
Dokl.AN SSSR 137 no.5:1042-1045 Ap '61. (MIRA 14:4)

1. Moskovskiy gosudarstvennyy universitet im.M.V.Lomonosova. Predstavleno akademikom A.N.Kolmogorovym.

(Groups, Theory of)

(Harmonic functions)

13

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16, 6100

S/020/61/141/002/005/027  
C111/C444

AUTHOR: Dynkin, Ye. B.

TITLE: Non-negative eigenfunctions of Laplace-Beltrami operator and Brownian motion in certain symmetric spaces

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 2, 1961, 288-291

TEXT: Described are all non-negative solutions of

$$(A - c)f = 0, \quad (1)$$

where  $c$  = constant and  $A$  is the Laplace-Beltrami operator in a symmetric space  $E$  with negative curvature, its movement group being isomorphic to the complex unimodular group of  $l$ -th order.

Let  $L$  be an  $l$ -dimensional complex Euclidean space;  $G$  be the group of all linear transformations of  $L$  with determinant 1;  $E$  be the set of all  $x \in G$  to which a positive definite Hermitian form  $(x\xi, \eta)$  ( $\xi, \eta \in E$ ) corresponds. To each  $x \in G$  there corresponds a transformation  $S_x$  of  $E$ :  $S_x \xi = x^* \xi$ .

Let  $e^{s_1}, e^{s_2}, \dots, e^{s_l}, s_1 \geq s_2 \geq \dots \geq s_l, s_1 + s_2 + \dots + s_l = 0$  be

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Non-negative eigenfunctions of . . .

the characteristic roots of an operator  $x \in E$ .  $g(x)$  indicates the sequence  $(g_1, \dots, g_1)$ . In  $E$  there exists a Riemannian metric  $d(x, y)$

which is invariant under all  $S_g (g \in G)$ . If one demands:

$\frac{d(e, x)}{|g(x)|} \rightarrow 1$  for  $|g(x)| \rightarrow 0$ , then it is completely determined ( $e$  be the identity transformation). Let  $A$  be the Laplace-Beltrami operator corresponding to this metric.

Let  $\delta = (\delta_1, \dots, \delta_1)$ , where  $\delta_j = \frac{1}{2} (1 + 1 - 2j)$ . It is stated that for  $e < -\delta^2$  every non-negative solution of (1) vanishes. The concept of the Green-function is introduced for (1) and it is stated in theorem 1 that (1) always possesses a Green function  $h(x, y)$  for  $e \gg -\delta^2$  which is positive everywhere. For  $d(x, y) \rightarrow \infty$  it shows the behaviour

$$h(x, y) \sim \alpha_1 e^{-\alpha_1 |g|} |g|^{1/2(3-1^2)} \prod_{j < k} \frac{g_j - g_k}{\sinh^{1/2}(g_j - g_k)}$$

where  $\alpha_1$  is a constant,  $|g| = (g^2)^{1/2}$ ,  $g^2 = g_1^2 + \dots + g_1^2$ .

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The solution  $f$  of (1) is called minimal, if  $f \geq 0$  and if every non-negative solution  $\tilde{f}$ , where  $\tilde{f} \leq f$ , differs from  $f$  only by a constant factor.

Let  $B$  be the set of the bases of  $L$ , and  $R$  be the set of all sequences  $\xi = (\xi_1, \dots, \xi_l)$  of real numbers for which  $\xi_1 \geq \dots \geq \xi_l$ ,  $\xi_1 + \dots + \xi_l = 0$ . For  $b = (e_1, \dots, e_l) \in B$  and  $\xi \in R$  let

$$f_{b,\xi}(x) = \prod_{k=1}^l [d_{b,k}(x)]^{-1-\xi_k + \xi_{k+1}},$$

where

$$d_{b,k}(x) = \begin{vmatrix} (xe_1, e_1) & \dots & (xe_1, e_k) \\ \dots & \dots & \dots \\ (xe_k, e_1) & \dots & (xe_k, e_k) \end{vmatrix}, \quad \xi_{l+1} = 1 - \xi_l$$

Let  $\xi \in R_0$ , if  $\xi \in R$  and  $\xi^2 = \delta^2 + c$ .

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Theorem 2: The set of the minimal solutions of (1) is identical with the set of the functions  $f_{b,g}(x)$  ( $b \in B$ ,  $g \in R_c$ ).

Let  $V$  be the set of all orthonormal bases of  $E$ , proportional bases being identified. ✓

Theorem 3: Every minimal solution of (1) is uniquely representable in the form  $\alpha f_{v,g}$  ( $\alpha > 0$ ,  $v \in V$ ,  $g \in R_c$ ).

The formula

$$f(x) = \int_{V \times R_c} f_{v,g}(x) d\mu$$

gives a one-to-one correspondence between all non-negative solutions of (1) and all finite measures of  $V \times R_c$ .

Theorem 4: The set of all non-negative spherical functions is given by the formula:

$$f(x) = \int_V f_{v,g}(x) d\mu \quad (2)$$

where  $c \in R$  and  $\mu$  is an arbitrary finite measure on  $V$ . The pair  $c, \mu$

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is uniquely determined by f.

Further on it is stated (theorem 5) that for  $c \neq 0$  all non-negative solutions of (1), being different from zero, are unbounded and that the set of all bounded solutions of  $Af = 0$  is given by

$$f(x) = \int_V \pi(x, v) F(v) d\mu_0$$

where  $F$  is an arbitrary bounded Borel-function on  $V$ ,  $\mu_0$  is a probability measure on  $V$ , being invariant under all transformations which are induced by the unitary operator  $g$  in  $V$ ;

$\pi(x, v) = f_{v, \delta}(x) = \prod_{k=1}^{1-1} d_{v, k}(x)^{-2}$ . To the differential operator there

corresponds a continuous Markov process  $x$ , which is called a Brownian motion in  $E$ ; see (Ref. 5: K. Ito, Mem. College Sci. Univ. Kyoto, Ser. A, 28, Mathematics, no. 1, 81 (1953)).

Theorem 5: At arbitrary initial state  $x$  there exist almost surely the Card 5/7

Non-negative eigenfunctions of . . .  
limits

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C111/0444

$$\lim_{t \rightarrow \infty} \frac{\varphi(x_t)}{|\varphi(x_t)|} = \frac{\delta}{|\delta|}, \quad \lim_{t \rightarrow \infty} v(x_t) = \eta$$

where  $\delta$  is the vector defined above and where the probability distribution  $\eta$  is defined by

$$P_x\{\eta \in \Gamma\} = \int_{\Gamma} \pi(x, v) d\mu.$$

(For every operator  $x \in E$  there exists an orthonormal eigenbase;  $v(x)$  indicates the corresponding element of the space  $V$ ).  
In this paper the method of R. S. Martin (Ref. 1: R. S. Martin, Trans. Am. Math. Soc., 49, 137 (1941)) is used.

There are 3 Soviet-bloc and 3 non-Soviet-bloc references. The two  
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Non-negative eigenfunctions of . . .

S/020/61/141/002/005/027  
C111/C444

references to English-language publications read as follows:  
R. S. Martin, Trans. Am. Math. Soc., 49, 137 (1941); K. Ito, Mem. College  
Sci. Univ. Kyoto, Ser. A. 28, Mathematics, no. 1, 81 (1953)

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University im. M.V. Lomonosov)

PRESENTED: June 5, 1961, by A. N. Kolmogorov, Academician

SUBMITTED: June 5, 1961

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Card 7/7

DYNKIN, Yevgeniy B.

"Markov processes and problems in analysis"  
To be presented at the IMU International  
Congress of Mathematicians 1962 - Stockholm,  
Sweden, 15-22 Aug 62

Head, Chair of Probability (1961 Position)  
Moscow State Univeristy

S/020/62/144/003/002/030  
B112/B104

AUTHOR: Dynkin, Ye. B.

TITLE: Brownian motion with a decreasing measure  $\mu$  and a measure  $\nu$  of velocity

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 483-486

TEXT: A family of uniform continuous Markov processes  $X_t^\mu$ , each characterized by two measures  $\mu$  and  $\nu$  on a set  $G$ , is described as a Brownian motion with a decreasing measure  $\mu$  and a measure  $\nu$  of velocity.  $\mathcal{U}(G)$  is the set union of all open sets  $U$ , the closures of which are compact subsets of  $G$ .  $\mathcal{H}(G)$  is the union of all infinitely differentiable functions of  $G$ , each of which vanishes beyond a certain  $U \in \mathcal{U}(G)$ . If  $f$  is a locally integrable function of  $G$  whilst  $\psi$  is an even additive locally finite function of  $B_G$  ( $B_G$  denoting the system of all Borel subsets of  $G$ ), and if for each  $F \in \mathcal{H}(G)$  the equality

$$\int_G F(y) \psi(dy) = - (1/2) \int_G \Delta F(y) f(y) dy$$

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Brownian motion with a ...

S/020/62/144/003/002/030  
B112/B104

is fulfilled, then  $\psi$  is stated to be generated by the mapping  
 $\psi f: f \in D_\psi(G)$ ,  $\psi = \psi f$ . It is demonstrated that the set of all harmonic  
functions with respect to the Brownian motion  $X_t^\psi$  is equal to the set of  
all  $\psi_0$ -continuous solutions of the equation  $\psi f + \psi f = 0$ . Later the  
properties of the operator  $\mathcal{D} = -D_\psi(\psi + \mu)$  are investigated.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: February 23, 1962, by A. N. Kolmogorov, Academician

SUBMITTED: February 20, 1962

Card 2/2

KHANT, Dzh.A.[Hunt, G.A.]; KIRILLOVA, L.S.[translator]; SHUR, M.G.  
[translator]; DYNKIN, Ye.B., red.; BRYANDINSKAYA, A.A., red.;  
RYBKINA, V.P., tekhn. red.

[Markoff [sic] processes and ptentials]Markovskie protsessy i  
potentsialy. Moskva, Izd-vo inostr. lit-ry, 1962. 276 p.  
Translated from the English. (MIRA 16:1)  
(Markov processes) (Potential, Theory of)

VOROB'YEV, N.N., red.; GNEDENKO, B.V., red.; DOBRUSHIN, R.L., red.;  
DYNKIN, Ye.B., red.; KOLMOGOROV, A.N., red.; KUBILYUS, I.P.  
[KUBILIUS, I.P.], red.; LITNIK, Yu.V., red.; PROKHOROV, Yu.V.,  
red.; SMIRNOV, N.V., red.; STATULYAVICHYUS, V.A. [Statuliavicius,  
V.A.], red.; YAGLOM, A.M., red.; MELINENE, D., red.; PAKERITE, O.,  
tekh. red.

[Transactions of the Sixth Conference on Probability Theory and  
Mathematical Statistics, and of the Colloquy on Distributions  
in Infinite-Dimensional Spaces] Trudy 6 Vsesoiuznogo soveshcha-  
nia po teorii veroiatnostei i matematicheskoi statistike i kol-  
lokviuma po raspredeleniam v beskonochnomernykh prostranstvakh.  
Vilnius, Palanga, 1960. Vil'nius, Gos.izd-vo polit. i nauchn.  
lit-ry Litovskoi SSR, 1962. 493 p. (MIRA 15:12)

1. Vsesoyuznoye soveshchaniye po teorii veroyatnostey i matema-  
ticheskoy statistike i kollokviuma po raspredeleniyam v besko-  
nechnomernykh prostranstvakh. 6th, Vilnius, Palanga, 1960.  
(Probabilities--Congresses) (Mathematical statistics--Congresses)  
(Distribution (Probability theory))--Congresses)

ITO, K.[Ito, Kiyoshi]; VENTTSEL', A.D.[translator]; DYNKIN, Ye.B.,  
red.; BRYANDINSKAYA, A.A., red.; KHOMYAKOV, A.D., tekhn.  
red.

[Probabilistic processes] Veroiatnostnye protsessy. Pod  
red. E.B.Dynkina. Moskva, Izd-vo inostr. lit-ry. No.2.  
1963. 135 p.

(MIRA 16:11)

(Probabilities)

PHASE I BOOK EXPLOITATION

SOV/6470

Dynkin, Yevgeniy Borisovich

Markovskiye protsessy (Markov Processes) Moscow, Fizmatgiz, 1963.  
859 p. (Series: Teoriya veroyatnostey i matematicheskaya  
statistika) 8000 copies printed.

Ed.: A. A. Yushkevich; Tech. Ed.: K. F. Brudno.

PURPOSE: The book is intended for senior students, aspirants,  
and scientific workers specializing in the probability  
theory and associated disciplines.

COVERAGE: A systematic presentation of the modern theory of the  
Markov processes is given. The book is based on the author's  
monograph: "Fundamentals of the Theory of Markov Processes,"  
Fizmatgiz, 1959. The stationary Markov processes are analyzed  
with special attention paid to infinitesimal and characteristic  
operators. The additive functionals and transformations of  
Markov processes are discussed with their application to the

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Markov Processes (Cont.)

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theory of stochastic Itô integrals. The harmonic and superharmonic functions associated with Markov processes are studied. The results obtained are applied to the study of the many-dimensional Wiener process and its transformations, and to continuous strictly Markov processes on a straight line. In the supplement, mathematical tools are given to facilitate the reading of the text. Results obtained by the participants of the seminar (under the author's guidance) on the theory of Markov processes at Moscow University are used extensively in the monograph and in this connection the author thanks A. D. Venttsel', V. A. Volkonskiy, I. V. Girsanov, L. V. Seregin, V. N. Tutubalin, M. I. Freydlin, P. Z. Khas'minskiy, M. G. Shur, and A. A. Yushkevich. The author thanks O. A. Oleynik and A. S. Kalashnikov for consultations and I. L. Genis and O. S. Konstantinova for technical work. There are 185 references, mostly non-Soviet.

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Preface

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L 12880-63 EWT(d)/EGG(w)/BDS AFFTC IJP(C)  
 ACCESSION NR: AP3000508 S/0020/63/150/002/0238/0240

AUTHOR: Dyknin, Ye. B. 52

TITLE: Optimal selection of the instant of cut-off of a Markov process 16

SOURCE: AN SSSR. Doklady, v. 150, no. 2, 1963, 238-240

TOPIC TAGS: Markov process

ABSTRACT: Given a Markov process  $(x \text{ sub } t, Zeta, M \text{ sub } t, P \text{ sub } x)$  and a non-negative function  $g(x)$ , the problem is to determine the conditions under which the mathematical expectation  $M \text{ sub } x g(x \text{ sub } Tau)$  has a maximum. The author obtains bounds for  $M \text{ sub } x g(x \text{ sub } Tau)$  and indicates that even for discrete Markov chains a maximum may fail to exist. However, if the space is finite, then  $M \text{ sub } x g(x \text{ sub } Tau)$  always attains its maximum.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 12Dec62

DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: MM  
 Card 1/1

NO REF SOV: 003

OTHER: 002

E 57846-65 EWT(d) IJP(c)  
NR: AP5018687

BR/0042/64/019/005/0007/0050

Franklin, Ye. B.

on boundaries and non-negative solutions of a boundary value problem  
partial derivative

speichl matematicheskikh nauk, v. 19, no. 5, 1974, 1975

Boundary problem, function theory, mathematical analysis

**Abstract:** This article is a survey of work done on the application of a method developed by R. S. Martin for the expression of all positive harmonic functions in an arbitrary region in  $d$ -dimensional Euclidean space. This method was later extended from harmonic functions to solutions of elliptic differential equations and certain other types of equations

(finite difference equations, integral equations, etc.) associated with random and Markov processes. Here Martin's method is applied to the problem of non-negative solutions of boundary-value problems. Problems included include boundary-value problems for the Laplace equation in a region boundary (which is a special set of points) and all non-negative harmonic functions: an arbitrary badly behaved region in a manner similar to the well-known expansion of

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LIBRARY NR: AP5018687

harmonic functions in terms of functions on the  
 cones with the boundary points of a cone. The  
 cones in linear topological spaces.  
 Directional derivatives, general and particular  
 problems with directional derivatives.  
 As consequences, Green's formula,  
 (the discussion reduced), the asymptotic  
 boundary for boundary-value  
 non-negative solutions and solutions of the  
 value problem. Orig. art. has 158 formulas.

none

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OTHER: 011

14

ATTN

Card 2/2

DYNKIN, Ye.B.

Nonnegative solutions to a boundary value problem with a  
directional derivative. Dokl. AN SSSR 157 no.5:1028.  
1030 Ag '64. (MIRA 17:9)

1. Moskovskiy gosudarstvennyy universitet. Predstavleno  
akademikom A.N. Kolmogorovym.

DYNKIN, Ya.B. (Moscow)

Controlled random sequences. Teor. veroiat. i ee prim. 10 no.1:  
3-18 '65. (MIRA.18:3)

L 34029-66 cwt(d)/r LIP(c)

ACC NR: AP6025496

SOURCE CODE: UR/0038/66/030/002/0455/0478

AUTHOR: Dynkin, Ye. B.

ORG: none

TITLE: Brownian movement in certain symmetric spaces and negative eigenfunctions of the Laplace-Beltrami operator

SOURCE: AN SSSR. Izvestiya. Seriya matematicheskaya, v. 30, no. 2, 1966, 455-478

TOPIC TAGS: Brownian motion, particle trajectory, mathematic operator

ABSTRACT: The author calculates Martin's boundary of symmetric spaces  $SL(1)/SU(1)$  relative to Laplace-Beltrami operator  $\mathcal{D}$  and operators  $\mathcal{D}cI$ , where  $c$  is a constant. As an application the author studies the behavior of trajectories of Brownian movement in these spaces, given  $t \rightarrow \infty$ . Orig. art. has: 77 formulas. [JPRS: 36,775]

SUB CODE: 12 / SUBM DATE: 28May65 / ORIG REF: 009 / QTH REF: 003

Card 1/1 *pla*

UDC: 519.2

0916 0825

KRIMER, R.N., inzh.; TSVELENEVA, G.V., inzh.; DYMKINA, A.G., inzh.

Rapid method of drying large porcelain insulators. Stek.  
i ker. 2i no.7:28-32 J1 '64. (MIRA 17:10)

1. Moskovskiy zavod "Izolyator."

DYNKINA, F.Z., inzh.

Using hydraulic copying carriages. Sbor. st. NIITIAZHMASHa  
Uralmashzavoda no.4:83-98 '64. (MIRA 17:12)

SEMEANOVA, A.S.; PARAMONKOV, Ye.Ya.; FEDOTOV, B.G.; GOL'DENBERG,  
A.L.; IL'CHENKO, P.A.; CHAPLINA, A.M.; SKURIKHINA, V.S.;  
SAZHIN, B.I.; MATVEYEVA, Ye.N.; KOZOLA, A.A.; DYN'KINA,  
G.M.; SIROTA, A.G.; RYBIKOV, Ye.P.; GERBILSKIY, I.S.;  
SHCHUTSKIY, S.V., red.; SHUR, Ye.I., red.

[Medium pressure polyethylene] Polietilen srednego davleniia.  
Moskva, Khimia, 1965. 89 p. (MIRA 18:7)

1. Nauchno-issledovatel'skiy institut polimerizatsionnykh  
plastmass (for all except Shchutskiy, Shur).

DYNKINA, I.Z., Cand Med Sci -- (diss) "Changes in  
the pancreas in sudden death from diseases of the  
heart and vessels." [Saratov<sup>9</sup> 1958]. 16 pp (Saratov  
State Med Inst ) 200 copies (KL, 29-58, 136)

- 111 -

BOGDANOVSKAYA, R.P.; DYNKINA, I.Z.

Sudden death in angiotrophoneurotic edema of the larynx. Sud.-  
med.ekspert. 2 no.4:49-50 0-D '59. (MIRA 13:5)

1. Kafedra sudebnoy meditsiny (zav. - prof. O.Kh. Porsheyev)  
Chelyabinskogo meditsinskogo instituta.  
(LARYNX--DISEASES)

DYNKINA, I. Z.

Cand Med Sci - (diss) "Changes in the pancreas during sudden death /skoropostizhnaya smert' / from ailments of the heart and vessels." Leningrad, 1961. 13 pp; (Leningrad Pediatrics Med Inst); 250 copies; price not given; (KL, 6-61 sup, 237)

KOSTRYUKOVA, L.I., kand. tekhn. nauk; DYN'KINA, M.A., nauchnyy sootrudnik;  
BELOVA, I.S., nauchnyy sootrudnik.

Investigating the process of the drying of shoe cardboard.  
Nauch.-issl. trudy VNIPIK no.14/25 48 '69. (MIRA 18:12)

*Dyn'kina, N.M.*

USSR/Optics - Photography.

K-11

Abs Jour : Referat Zhur - Fizika, No 3, 1957, 8141

Author : Dyn'kina, N.M.

Inst :

Title : Vertical Reproduction Setup.

Orig Pub : Zh. nauch. i prokl. fotogr. i kinematogr., 1956, 1, No 3,  
235

Abstract : Description of a reproduction setup of simple construction under the photocamera of various dimensions, having a wide range of horizontal displacement of camera in two directions and a balanced counterweight for raising and lifting the camera. When the photocamera is replaced by projection equipment, the setup can be readily converted into an enlarger.

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- 140 -

KALYANOVA, M.P.; DYMKINA, S.Ya.; DROMOVA, N.P.

Electrolytic sharpening of punches used for piercing spinnerette  
holes. Sbor. st. NIILTEKHASH no.3:164-165 '57. (MIRA 12:10)  
(Electrolytic polishing)

TODER, I. A., inzh.; DYNKINA, P. P., kand. tekhn. nauk; RUMYANTSEV,  
N. I., inzh.

Using polyamide materials for bearings of rolling mills. Vest.  
mashinostr. 42 no.10:53-56 0 '62. (MIRA 15:10)

(Plastic bearings)

AGITSKIY, V.A.; DYN'KINA, S.Ye.

Underground leaching of copper. Gor.zhur.no.11:35-38 N '56.  
(MLRA 10:1)

1.Unipromed'.  
(Copper mines and mining) (Leaching)